

We claim

Patent Claims

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1. Static mixer module (10), consisting of a disc which is provided with a multiplicity of orifices (6) and which is structured on its front side (2) facing the mix and on its rear side (3) by means of channels (4) and (5) running, in particular, in parallel or concentrically, and in which the orifices (6) are made in the flanks (8) of the inlet channels (4) and open into the flanks (9) of the mixing channels (5).
2. Static mixer module according to Claim 1, characterized in that the inlet channels (4) and/or mixing channels (5) have straight flanks which are at an angle  $\alpha$  of 5 degrees to 85 degrees to the disc plane (13) of the front side (2) and/or of the rear side (3).
3. Static mixer module according to Claim 1, characterized in that the flanks (8) of the inlet channels (4) and/or the flanks (9) of the mixing channels (5) are straight and are at an angle  $\alpha$  smaller than 15 degrees to the disc plane (13) of the front side (2) and/or of the rear side (3), and in that the mixer module has additional spacer contours, in particular bosses (15a), teeth (15b) or warts (15c), on the front side (2) and/or the rear side (3).
4. Static mixer module according to one of Claims 1 to 3, characterized in that the mid-axis (16) or the wall of the orifices (6) in the flanks of the channels forms an angle  $\beta$  of  $\pm 30$  degrees to the flank plane (17).
5. Static mixer module according to one of Claims 1 to 4, characterized in that the inlet channels (4) and/or mixing channels (5) have a V-shaped, U-shaped, rectangular or trapezoidal cross-sectional profile.
6. Static mixer module according to one of Claims 1 to 5, characterized in that the mixer module is divided into two or more regions or segments which have differently arranged and/or differently structured inlet channels (4) and/or mixing channels (5).
7. Static mixer module according to one of Claims 1 to 6, characterized in that the mixer module is divided into two or more regions or segments which have different spacings between the orifices and/or a different cross-sectional surface of the orifices.

8. Static mixer module according to Claim 6 or 7, characterized in that the boundaries of the regions or segments are arranged concentrically about the centre point of the mixer module.
- 6 9. Static mixer module according to one of Claims 6 to 8, characterized in that the spacing between the planes of the front side and the planes of the rear side of the mixer is different in the various regions or segments.
- 12 10. Static mixer module according to one of Claims 1 to 9, characterized in that the module has, on the front side (2), baffle surfaces (18, 19) in the disc plane, in particular flattenings (18) or sheet-like elevations (19).
11. Static mixer module according to one of Claims 1 to 10, characterized in that the mixer consists of alloyed steel, non-ferrous metal, plastic, glass, ceramic or a catalytically acting alloy.
- 18 12. Mixer arrangement, consisting of at least two static mixer elements arranged one behind the other, characterized in that at least one mixer element is a disc-shaped static mixer module according to one of Claims 1 to 11.
- 24 13. Mixer arrangement according to Claim 12, characterized in that, in the mixer arrangement, at least two disc-shaped static mixer modules according to one of Claims 1 to 11 are arranged directly one behind the other.
- 30 14. Mixer arrangement according to Claim 11, characterized in that the disc-shaped static mixer modules are positioned in such a way that the mixing channels of the first mixer module are arranged so as to be offset or rotated relative to the inlet channels of the second mixer module.
- 36 15. Mixer arrangement according to Claim 14, characterized in that the adjacent disc-shaped static mixer modules have parallel sets of straight inlet channels and mixing channels and the mutually facing mixing channels and inlet channels of the adjacent mixer modules are rotated relative to one another at an angle  $\gamma$  of 5 degrees to 175 degrees.

- 6 16. Mixer arrangement according to one of Claims 11 to 15, characterized in that the mixer arrangement has at least one disc-shaped static mixer module according to Claim 7, the static mixer module with regions or segments being followed directly by a static mixer element which is a conventional static mixer or a disc-shaped static mixer module, the outer or inner contour of which is adapted to the boundaries of the regions or segments and which engages into the regions or segments of the disc-shaped static mixer module which have a smaller spacing between the disc plane of the front side and the disc plane of the rear side than the remaining regions or segments.

Sub A<sup>2</sup> 12 } 17. Mixer arrangement according to Claim 16, characterized in that the unit consisting of the disc-shaped static mixer module and of the engaging static mixer is designed in such a way that the engaging static mixer terminates flush with the plane of the front side or the plane of the rear side of the segments or regions, the said plane having a maximum spacing from the planes of the front side or the rear side respectively.

- 18 18. Mixer with at least two static mixer modules according to one of Claims 1 to 11 or with a mixer arrangement according to one of Claims 12 to 17, in which the mixer modules or the mixer arrangement are installed in a pipe, through which mix flows, in such a way that the front side of an individual mixer module or of a mixer module from the mixer arrangement points in the opposite direction to the direction of flow of the mix.

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